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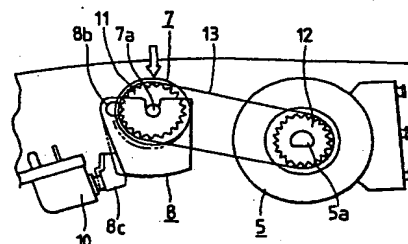
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(54) Remote control device.

(57) A hand-held remote control housing (1) comprises a roller (7) to be manipulated by a finger. A movable bearing member (8) has a receiving portion (8a) to support a rotary shaft (7a) of the roller (7) and a pressing portion (8c) held in abutment against a push button switch (10). The bearing member (8) is angularly movable with respect to the case 1, around the axis of stubs (8b). The axis of stubs (8b) and the axis of the rotary shaft (7a) are offset from each other. The rotary shaft (7a) and a rotary shaft (5a) of an encoder (5) are provided with respective pulleys (11,12) which are coupled to each other using a belt (13). In order to prevent water that can enter the housing (1) via the roller (7) to cause short circuits, the roller (7) is surrounded by a water receiving member (14) comprising a drainage passage (14b).

FIG. 2



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municating passage between the main chamber and the sub-chamber.

With the above construction, when the manipulatable roller is pushed down by a finger, a rotative force is applied to the movable bearing member through the rotary shaft so that the pressing portion of the movable bearing member presses the push button switch in the case for actuating the same. Accordingly, a desired control signal can be outputted to the display by pushing down the manipulatable roller after manually rotating the same, without moving the finger the manipulatable roller.

Also, since the axis of rotation of the manipulatable roller and the axis of rotation of the encoder can be spaced from each other by any desired distance, the need of forming a large stepwise level difference in the manipulating surface of the case can be eliminated by setting the axis of rotation of the manipulatable roller having a reduced diameter at a position higher than the axis of rotation of the encoder.

Furthermore, since the space in the case facing the window opening is partitioned by the rib of the case and the main chamber of the water receiving member, some amount of water entering through the window opening can be accumulated in the main chamber and naturally dried up there without leaking to any other locations. Should a large amount of water enters the main chamber, the water would be caused to flood through the cut-out to flow into the sub-chamber, followed by discharge through the drainage passage from the sub-chamber.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an exploded perspective view of principal parts of a remote control according to one embodiment of the present invention.

Fig. 2 is a view for explaining operation of the remote control.

Fig. 3 is a sectional view of the remote control taken along in the lengthwise direction of a manipulatable roller.

Fig. 4 is a sectional view of the remote control taken along in the radial direction of the manipulatable roller.

Fig. 5 is an entire plan view of the remote control.

Fig. 6 is a perspective view, partly omitted, showing the positional relationship between a movable bearing member for the manipulatable roller and a push button switch of the remote control.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Hereinafter, an embodiment of the present invention will be described with reference to the drawings.

Figs. 1 through 6 are all conducive to explain a remote control as one embodiment of an input device according to the present invention in which; Fig. 1 is an exploded perspective view of principal parts of the remote control, Fig. 2 is a view for explaining operation of the remote control, Fig. 3 is a sectional view of the remote control taken along in the lengthwise direction of a manipulatable roller, Fig. 4 is a sectional view of the remote control taken along in the radial direction of the manipulatable roller, Fig. 5 is an entire plan view of the remote control, and Fig. 6 is a perspective view, partly omitted, showing the positional relationship between a movable bearing member for the manipulatable roller and a push button switch of the remote control.

The input device shown in these drawings serves as a remote control for use in TVs and video tape recorders, and has a resin-made case 1 comprised of an upper case 2 and a lower case 3 combined with each other. A printed circuit board 4, an encoder 5 and so on are incorporated inside the case 1. On the surface of the upper case 2 as the manipulating surface, there are exposed a plurality of key switches 6 adapted to turn on or off a power supply, select a menu and adjust sound volume, by way of example, as well as a manipulatable roller 7 adapted to control the position of a cursor, by way of example.

The manipulatable roller 7 is integral with a rotary shaft 7a made of metal, the rotary shaft 7a being supported by a pair of receiving portions 8a of a resin-made movable bearing member 8 in a journaled manner which is assembled in the case 1. The manipulatable roller 7 is therefore rotatable about its own axis while partly projecting through a window opening 1a bored in the manipulating surface of the case 1. A pair of recessed projections 2a projecting from the rear surface of the upper case 2 and a pair of recessed projections 9a on a resin-made support plate 9 for supporting the printed circuit board 4 inside the case 1 cooperatively support respective stubs 8b of the movable bearing member 8 in a journaled manner, which are projected with their axes set offset from the axis of the rotatable shaft 7a, so that the movable bearing member 8 is held in the case 1 to be rotatable with respect thereto. When the manipulatable roller 7 is pushed down, a rotative force is applied to the movable bearing member 8 through the rotary shaft 7a, causing both the manipulatable roller 7 and the movable bearing member 8 to rotate to-

roller 7 being pushed down (see Fig. 2) like this embodiment, the return force of the timing belt 13 itself is also utilized when the manipulatable roller 7 and the movable bearing member 8 are both returned to the original position after pushing down the manipulatable roller 7. In opposition to the illustrated embodiment, even where the components are arranged such that the above axis-to-axis distance is narrowed upon the manipulatable roller 7 being pushed down, there occurs no problem so long as the return spring used for returning the push button switch 10 has a relatively strong resilient force.

In addition, with the present remote control, the space in the case 1 facing the window opening 1a is partitioned by the rib 2b on the rear surface of the upper case 2 and the main chamber 14a of the water receiving member 14. Therefore, even if some amount of water enters the case 1 through the window opening 1a, for example, upon water being accidentally spilled over the case, the water can be accumulated in the main chamber 14a and naturally dried up there without leaking to any other locations. Should a large amount of water enters the main chamber 14a, the water would be caused to flood through the cut-out 14d to flow into the sub-chamber 14b, followed by discharge through the drainage passage 15 from the sub-chamber 14b. As a result, there is no fear that the water entered through the window opening 1a may give rise to a trouble of short-circuit, which ensures high reliability.

It should be noted that functions effected by manually operating the manipulatable roller to rotate and push down the same can be set optionally depending on demands. By way of example, those functions may be set such that images are advanced frame by frame or scrolled by rotating the manipulatable roller 7 and on/off control of rewinding and fast forwarding of tapes may be changed over by pushing down the manipulatable roller 7.

It is needless to say that the present invention is also applicable to any desired input devices with manipulatable rollers other than the illustrated remote control.

According to the present invention, as has been described above, since the push button switch in the case can be pressed and actuated through the movable bearing member by pushing down the manipulatable roller after manually rotating the same, it is possible to provide the input device with the manipulatable roller which requires a smaller amount of movement of a finger necessary for the manipulation and thus has a high degree of operability.

Also, according to the present invention, since the encoder is interlockingly coupled to the ma-

nipulatable roller through the pulleys and the belt, the axis of rotation of the manipulatable roller having a reduced diameter can be set at a position higher than the axis of rotation of the encoder. This eliminates the need of forming a large stepwise level difference in the manipulating surface of the case. As a result, there can be obtained advantages of improving an aesthetic appearance and increasing the degree of freedom in design of the thin-type input device with the manipulatable roller.

Furthermore, according to the present invention, even if water enters through the window opening of the case through which the manipulatable roller is exposed, the water can be accumulated in the main chamber of the water receiving member and naturally dried up there, or the water can be discharged through the drainage passage from the sub-chamber of the water receiving member. It is thus possible to provide the input device with the manipulatable roller which has no fear of causing a trouble of short-circuit with the water entering through the window opening of the case and is highly reliable.

## Claims

1. An input device in which a first control signal is outputted to a display as external equipment by manually rotating a manipulatable roller which is partly projecting through a window opening of a case, and a second control signal is outputted to said display by pressing a push button switch incorporated in said case to be actuated, wherein a movable bearing member having a receiving portion to support a rotary shaft of said manipulatable roller in a journaled manner and a pressing portion held in abutment against said push button switch is disposed in said case and held angularly movable with respect to said case, and the center of angular movement of said movable bearing member and the axis of said rotary shaft are offset from each other.
2. An input device comprising a manipulatable roller which can rotate about its own axis and is partly projecting through a window opening of a case, and an encoder which is incorporated in said case and rotated in interlock with said manipulatable roller, said input device outputting a control signal to a display as external equipment depending on the amount and the direction of rotation of said manipulatable roller that are detected by said encoder, wherein a rotary shaft of said manipulatable roller and a rotary shaft of said encoder are provided with respective pulleys and these pulleys are coupled to each other using a belt.

FIG. 1

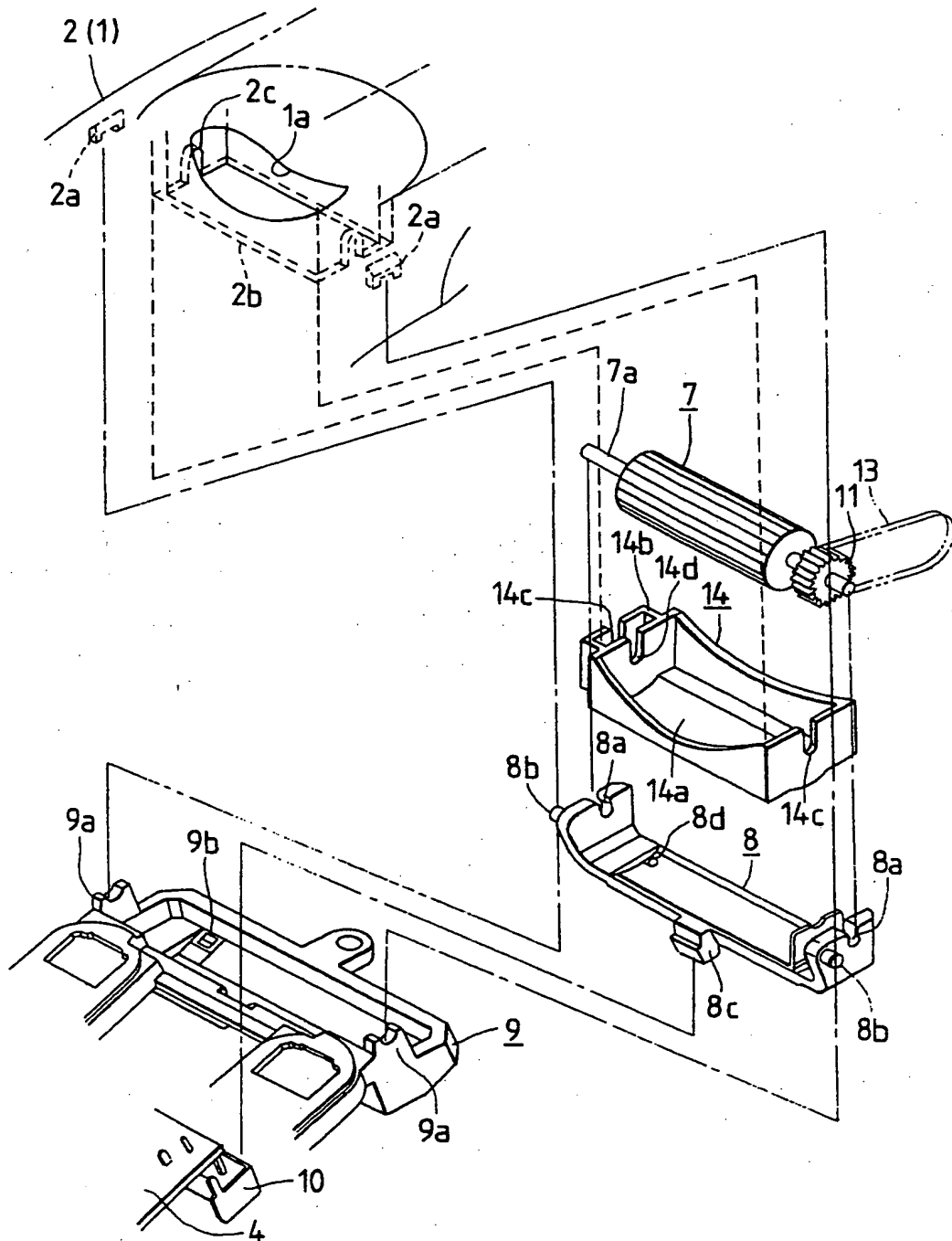


FIG. 5

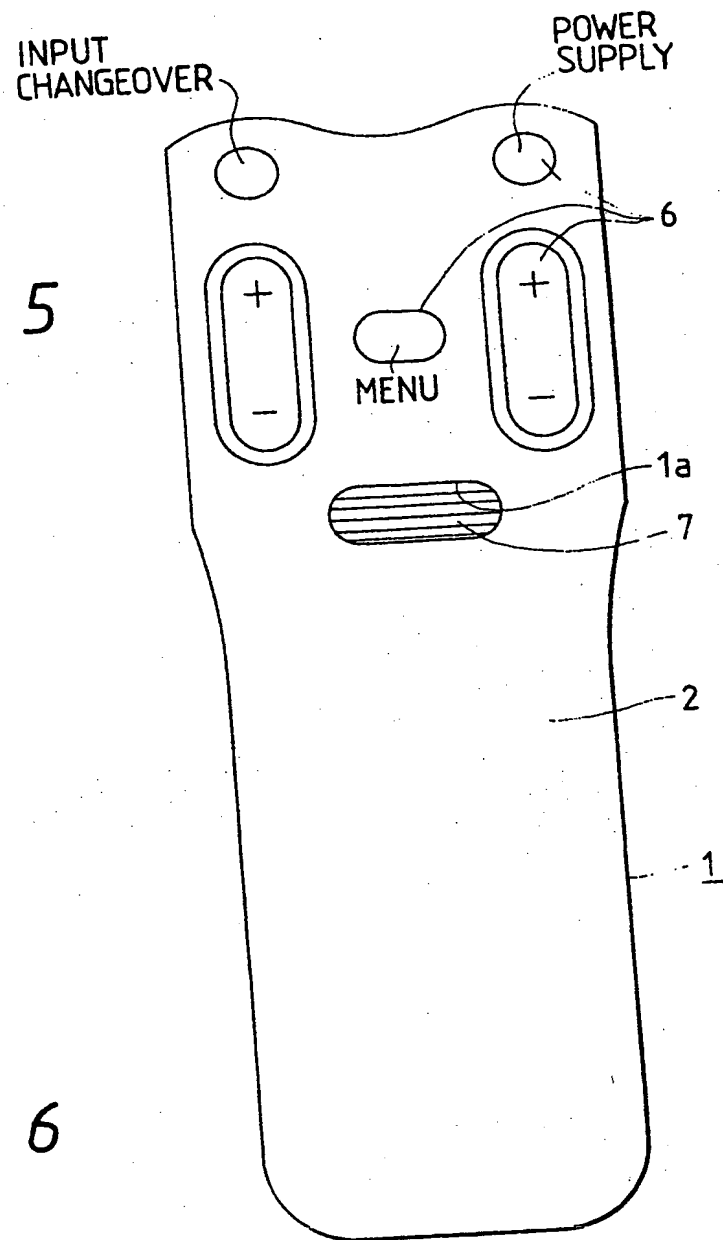


FIG. 6

